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A MONOGRAPH OF THE GENUS *TRIGONURUS* (COLEOPTERA: STAPHYLINIDAE)

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The genus *Trigonurus* is placed in our present classification of the family Staphylinidae in the subfamily Piestinae, the tribe Piestini, and the group Trigonuri. The accurate definition of these groups is not possible at the present time, but it can be said in general that the Piestinae are distinguished by having the anterior coxae small and globose, the posterior coxae small and approximate but either globose or transverse, by being without ocelli, and by having the 11-segmented antennae inserted at the lateral corners of the vertex near the eyes.

The tribe Piestini has the tarsi 5-segmented. The group Trigonuri has the elytra extending well beyond the apex of the metasternum. Only three genera are known in this group, *Apatetica*, *Nodynus*, and *Trigonurus*. The first two are confined to the Orient and differ from *Trigonurus* in having the tibiae keeled or grooved, by having the metasternal process longer, and in the broadly angulate sides of the pronotum. *Trigonurus* has a very distinct facies which makes it readily distinguishable from all other Staphylinids and gives it something of the appearance of a Nitidulid. When once recognized, it can scarcely be mistaken for anything else.

This genus was first recognized in Europe, where two species were known by 1865. Nothing new has been discovered in that part of the world since that time, except for slight extensions of the known range of one of the species. However, in 1874, Leconte described three species from the Pacific Coast of North America, and in 1875 Sharp described two more from the same region. One of Sharp's species has since been considered a synonym, one new species has been described recently by Van Dyke, and I am now presenting another

new species. The genus therefore now contains eight species (with one or two synonyms) of which one occurs in Europe proper, one in the Caucasus, and six in Pacific North America.

Two other specific names have been used in this genus. In 1895 Keen recorded a species from the Queen Charlotte Islands under the name *T. nebrionides* Fauvel. This is apparently a *nomen nudum* and very likely is the same as *T. crotchii* Leconte. In 1852 Mäklin described *Lathrimaeum subcostatum* from Sitkha, Alaska. In the Henshaw catalog of 1885 it was kept in *Lathrimaeum* but in the Bernhauer and Schubert Coleopterorum Catalogus of 1910 (pars 19, page 5) it was transferred to *Trigonurus*. The Leng catalog of 1920 followed Bernhauer and Schubert, but in 1933 Scheerpeltz, in the supplement to the Coleopterorum Catalogus, restores the species to its original genus. Finally Van Dyke in 1934 writes, "I believe that this species is a true *Trigonurus* and quite close to *crotchii* Lec. if not identical. Its status, however, will have to remain in doubt until we are able to again collect in its type locality."

In none of these opinions upon the status of *subcostatus* do the respective writers give their reasons for the conclusions they have reached, and we are left to conclude that they are based upon the original description which is all that has been written about the species. Dr. Van Dyke examined the types of Sharp's species of *Trigonurus* in the British Museum, but he apparently failed to note a specimen in the same part of the box labeled "Lathr. subc. Maeklin Type." This specimen was also labeled *Trigonurus subcostatus* and Sitkha. Although the history of the specimen is not clear, there can be little doubt

that it is the actual type of *subcostatum* Mäklin, and the specimen itself leaves not the slightest doubt that it is a true *Lathrimaeum* very closely similar to *L. pictum* Fauvel and other species. It is therefore eliminated from our study of *Trigonurus*, as indicated by me in 1939 in the Fourth Supplement to the Leng Catalog.

Prior to the publication of Dr. Van Dyke's revision of the American species in 1934, I had discussed the problems of identification in the genus with Dr. Van Dyke and found that we differed considerably in our interpretations of certain of the species. I have not tried to check on how Dr. Van Dyke's identifications agree or disagree with my present opinions, but I now recognize several errors in my own previous arrangement. *T. rugosus* and *T. crotchii* I had properly identified; what I had identified as *T. edwardsi* now proves to be a new species; and my identifications of *caelatus* and *lecontus* proved to be both errors for *edwardsi*.

I believe that these difficulties, and those of other workers as well, were due almost entirely to the fact that the characters used in the original descriptions are not sufficient to separate the species. When studying the types in the British Museum, I found that it was possible to make a key based on other characters that are much more usable and reliable. But a subsequent attempt to find characters in the genitalia of both the males and the females showed that these do not offer characters of value, at least with ordinary methods of preparation. Sufficient definitive characters have been found, however, on other parts of the body to make both the classification and the identification of the species reasonably certain and easy.

The following institutions and persons have very kindly lent or otherwise made available specimens for this study, and I gratefully acknowledge their courtesy: American Museum of Natural History, United States National Museum, Museum of Comparative Zoölogy, California Academy of Sciences, British Museum (Natural History), Mr. Hugh B. Leech of Salmon Arm, B. C. Specimens received from the California Academy include those from

the general collections, the Blaisdell collection, and the Fenyes collection, but not those in the Van Dyke collection. Specimens studied in the Museum of Comparative Zoölogy include ones in the Leconte, Fall, Liebeck, Bowditch, and Blanchard collections.

TRIGONURUS Mulsant

Trigonurus Mulsant, 1847, p. 515.—GAUBIL, 1849, p. 258.—SCHAUM, 1849, p. 148.—LACORDAIRE, 1854, pp. 120, 123.—DUVAL, 1857, p. 61.—REDTENBACHER, 1858, p. 239.—REICHE, 1865, pp. 641, 642.—SOLSKY, 1868, pp. 161, 162.—FAUVEL, 1872, p. 17.—SHARP, 1874, p. 421.—REDTENBACHER, 1874, p. 263.—SHARP, 1875, p. 204.—MULSANT AND REY, 1878, pp. 212, 214.—FAUVEL, 1878, p. 185.—SHARP, 1889, p. 467.—GANGLBAUER, 1895, p. 682.—HEYDEN, REITTER, AND WEISE, 1906, p. 126.—BERNHAEUER AND SCHUBERT, 1910, p. 5.—SCHAUFUSS, 1916, p. 147.—LENG, 1920, p. 92.—HANDLIRSCH, 1925, p. 571.—PORTEVIN, 1929, p. 429.—SCHEERPELTZ, 1933, p. 993.—VAN DYKE, 1934, pp. 177, 178.—BLACKWELDER, 1939, p. 22.

Trigonurus KEEN, 1895, p. 172 (misspelling).

GENOTYPE.—*Trigonurus mellyi* Mulsant (monobasic).

DIAGNOSIS.—Frontal sutures complete between the antennal fossae; postclypeus not attaining the eyes, the antennae inserted at the anterior lateral corners of the vertex near the eyes; labrum with delicate lateral appendages; without ocelli; compound eyes complete; antennae 11-segmented, not abruptly pubescent from any particular segment; mandibles without teeth; lacinia of maxilla much shorter than the galea; maxillary palpus 4-segmented; submentum separated from gula by union of submental sutures in front of gular pits; prementum divided into three small triangular sclerites; labial palpus 3-segmented, short and stout; elytra longer than the metasternum; alate; prosternum very narrowly and briefly produced between the coxae; the mesothoracic spiracles lying in the membrane near the pronotal lobes; meso- and metasternal lobes meeting midway between the mesothoracic coxal declivities; first abdominal segment entirely absent, second represented by a tergite alone, third to seventh with one paratergite on each side; intersegmental membranes of abdomen apparently entirely without minute sclerotizations; lateral plates of ninth segment not united either above or below; the male genitalia consist of a strong sclerotic tube with a bulbous base, a small median foramen situated ventrally at the junction of the tube and the bulb and between the base of the lateral lobes, the latter lying along the median lobe; all tarsi 5-segmented; anterior coxae globose; hind coxae contiguous, expanded laterally and caudally into a plate that is partly covered by the femur in repose.

REMARKS.—The history of the study of this genus taxonomically has been outlined above, but the actual history of the genus itself is not so clear. The genus has been found only in three widely separated mountain systems. This distribution is easily explained by the assumption that these areas are all that is now left of what was once a very extensive united habitat. Other explanations are possible also, and it is scarcely the place of this study to attempt to decide. There is little possibility of question that the eight species do form a single natural genus, since the one species which departs most from the general condition is one of the North American ones.

I have not been able to examine the two other genera which are placed in the group Trigonuri. These are *Apatetica* and *Nodynus*. The published descriptions and notes are not sufficient to permit a definite statement of their relationships. There is apparently little chance of confusing them with *Trigonurus*.

Inasmuch as I have not been able to examine the two European species (except *mellyi* briefly), I have not tried to make a key to include all the eight known species. *T. mellyi* will run in the following key to North American species to *T. sharpi*. From the descriptions it appears to differ from *sharpi* in having the elytral series of punctures somewhat impressed to form striae with the intervals feebly carinate. It also is said to have the eighth series excavated in a longitudinal fossa in apical fifth, whereas *sharpi* could scarcely be described in this way. *T. mellyi* is said to be about 5 1/2 mm. long, while *T. sharpi* is never over 4 1/2 mm. long.

I am unable to place *T. asiaticus* in relation to the other species. It seems to be very similar to *T. mellyi* but may differ in many details. It apparently has the pronotum finely strigulose and opaque, but the condition of the outer elytral striae or the hypomera is not recorded. Here again the recorded size is greater than for any of our species except *dilaticollis*.

KEY TO NORTH AMERICAN SPECIES OF *Trigonurus*

- 1.—Hypomera impunctate or with few punctures.....2.

- Hypomera coarsely punctate throughout.4.
- 2.—Eighth elytral stria deeply and coarsely punctured.....3.
- Eighth stria obsolescent.....*crotchi*.
- 3.—Pronotum not at all strigulose...*edwardsi*.
- Pronotum more or less strigulose...*sharpi*.
- 4.—Pronotum and elytra constricted at base.....*dilaticollis*.
- Pronotum and elytra not narrowed at base.....5.
- 5.—Pronotum densely rugosely punctate throughout; elytral series of punctures irregular, especially posteriorly; eighth series very confused, generally extending nearly to humerus.....*rugosus*.
- Pronotum not rugose on disk, with flattened shining intervals; elytral series only slightly irregular and traceable to apex; eighth series with large distinct punctures, not extending much beyond middle from apex.....*caelatus*.

Trigonurus edwardsi Sharp

Trigonurus edwardsi SHARP, 1875, p. 205.—FAUVEL, 1878, pp. 185, 186, 188.—BERNHAEUER AND SCHUBERT, 1910, p. 5.—LENG, 1920, p. 92.—VAN DYKE, 1934, pp. 177, 178, 179, 180, 182.—BLACKWELDER, 1939, p. 22.

DESCRIPTION.—Piceorufous. Head with two distinct longitudinal impressions and with frontal suture impressed; not finely but irregularly punctate, especially in front. Pronotum about three-fourths as long as wide, widest at base; sides sinuate but not distinctly converging until apical third, front angles obtuse but distinct; evenly convex except for a narrow shallow depression along midline and a broad concavity at each posterior angle; punctures irregular in size, not coarse on the disk and not crowded; the depressions more coarsely punctate; without strigulose ground sculpture. Hypomera with a few scattered small punctures near the sternum and coarse ones on the posterior lobe. Prosternum coarsely punctate throughout. Elytra conjointly over three-fourths as wide as long, one-eighth wider than pronotum, widest about middle and feebly narrowed to base and apex; humeral angles prominent, apex truncate, with outer angles narrowly rounded; not striate but with nine longitudinal series of coarse punctures, the first seven regular and complete, the eighth present only in apical third or half; intervals shining. Abdomen very finely and obsoletely punctured on the disk, more coarsely at the sides; with fine strigulose ground sculpture. Length, 3 3/4 to 4 mm.

TYPE LOCALITY.—(California).

TYPES.—Holotype (type) and one paratype (cotype) in the Sharp collection in the British Museum; one paratype (independent type) in the Museum of Comparative Zoölogy (No. 7372).

RECORDS.—The following are the records known to me:

CALIFORNIA: (Sharp, 1875; Fauvel, 1878; Leng, 1920), Southern California (Leng, 1920); SANTA CRUZ COUNTY (Nunenmacher, in Blackwelder coll.), Santa Cruz Mountains (A. Koebele, in U. S. Nat. Mus.; Blaisdell coll., in Cal. Acad. Sci.); SANTA CLARA COUNTY, Los Gatos (Hubbard and Schwarz, in U. S. Nat. Mus.), Santa Cruz (Van Dyke, 1934).

OREGON: (A. Koebele, in Blackwelder coll.).

ERRONEOUS OR DOUBTFUL RECORDS.—The following records have not been verified and are doubted for the reasons given in each case:

California: Marin County, Guerneville; Sonoma County, Hydesville; Humboldt County (Van Dyke, 1934). This species was not distinguished by Van Dyke from *sharpi*, to which these records probably pertain.

Washington: Port Angeles, The Forks, Seattle (Van Dyke, 1934). (Same comments as above.)

SPECIMENS EXAMINED.—I have studied all three of the types, two in the British Museum and one in the Museum of Comparative Zoölogy. In addition I have seen 11 examples in the U. S. National Museum, one in The American Museum of Natural History, one in the California Academy of Sciences, and seven in my own collection.

REMARKS.—This species may be at once distinguished from all the other American species by the nearly impunctate hypomera and the absence of strigulose ground sculpture on the pronotum.

The actual type locality is not known, but it is probably Central California. The types were collected by Henry Edwards of San Francisco.

Three specimens from Oregon in my collection, received in 1932 from Mr. F. W. Nunenmacher of Piedmont, California, are quite indistinguishable from the Santa Cruz examples. They have been compared directly both with the type in the British Museum and with the paratype in the Museum of Comparative Zoölogy. They are labeled only "Or." and "A. Koebele Collector." There must be some doubt as to the accuracy of these labels,

although the identification seems to be positive. One of these specimens bears an identification label from Col. T. L. Casey, as *T. lecontei*. There undoubtedly is another example from this lot in the Casey collection.

I find no records of the habits of this species.

Trigonurus sharpi, new species

DESCRIPTION.—Piceorufous. Head without distinct depressions but slightly elevated at center of vertex; frontal suture visible but not much impressed; punctures irregular, very sparse behind the frontal suture. Pronotum about one-sixth or one-fifth wider than long, widest at middle, nearly parallel to base, sides in front nearly straight but rather strongly converging; front angles obtuse but distinct, basal angles nearly right; evenly convex except for an irregular depression along midline and an indistinct arcuate one before the scutellum with the arms extended toward the anterior angles, and a broad concavity at each posterior angle; punctures very irregular in size, a few very coarse on the disk and in the depressions, the rest moderately small and separated by about their diameter; with more or less distinct strigulose ground sculpture. Hypomera with a few scattered small punctures near the sternum and coarse ones on the posterior lobe. Prosternum coarsely punctate throughout. Elytra conjointly over one-sixth longer than wide, one-seventh wider than pronotum, widest about middle and feebly narrowed to base and apex; humeral angles prominent, apex feebly arcuate with outer angles rather broadly rounded; without distinct striae but with nine longitudinal series of coarse punctures, the first seven regular and complete, the eighth strongly punctate and regular apically, sometimes confused basally or incomplete; the intervals narrow but shining. Abdomen moderately finely punctate, as densely on the disk as at the sides; with very feeble strigulose ground sculpture. Length, 3 1/2 to 4 1/2 mm.

TYPE LOCALITY.—Del Norte County, California.

Types.—Holotype, No. 54293, U. S. National Museum, collected on May 27, 1910 by F. W. Nunenmacher. Seven paratypes with same data; three from Inverness, Tamales Bay, Marin County, California, collected by Dr. F. E. Blaisdell on July 1st; two from Depoe Bay, Lincoln County, Oregon, collected on April 25, 1936 by K. M. Fender; one from Vancouver Island, British Columbia, collected April 29, 1896; and five from Vancouver, British Columbia, collected on October 18,

1931, by Hugh B. Leech. These paratypes are distributed among the following collections: U. S. National Museum, American Museum of Natural History, California Academy of Sciences, British Museum, Fall collection in the Museum of Comparative Zoölogy, H. B. Leech collection, and Blackwelder collection.

RECORDS.—The following are the records known to me:

CALIFORNIA: DEL NORTE COUNTY (Nunenmacher, in U. S. Nat. Mus., Brit. Mus., Blackwelder coll.); HUMBOLDT COUNTY, Fieldbrook (U. S. Nat. Mus.); SANTA CLARA COUNTY, Corte Madera Creek (Blackwelder coll.); SONOMA COUNTY, Stewarts Point (Blackwelder coll., Leech coll.), Duncan Mills (Cal. Acad. Sci.), Inverness, Tamales Bay (Cal. Acad. Sci., Amer. Mus. Nat. Hist.); SANTA CRUZ COUNTY, Santa Cruz Mountains (Fall coll. in Mus. Comp. Zoöl.).

OREGON: Cannon Beach (Blackwelder coll.), Depoe Bay (Leech coll.); LINN COUNTY, Albany (U. S. Nat. Mus.); LINCOLN COUNTY, Waldport (U. S. Nat. Mus.); JOSEPHINE COUNTY (Blackwelder coll.); WASHINGTON COUNTY, Dilley (Leech coll.); BENTON COUNTY, Corvallis (Fall coll. in Mus. Comp. Zoöl.).

WASHINGTON: THURSTON COUNTY, Olympia (Fall coll. in Mus. Comp. Zoöl.).

BRITISH COLUMBIA: NEW WESTMINSTER DISTRICT, Vancouver (Blackwelder coll., Cal. Acad. Sci., Leech Coll.); VANCOUVER ISLAND DISTRICT, Vancouver Island (Fall coll. in Mus. Comp. Zoöl.).

SPECIMENS EXAMINED.—I have seen ten examples in the U. S. National Museum, nine in the California Academy, one in the American Museum, five in the Fall collection in the Museum of Comparative Zoölogy, seven in the collection of H. B. Leech, and 18 in my own collection.

REMARKS.—This species may be at once distinguished from all other American species by the strigulose sculpture of the pronotum and the nearly impunctate hypomera. There is considerable variation in the distinctness of the strigulae, but they are always present in this species,

whereas in *edwardsi* there is no trace of them at all. The pronotum is relatively longer than in *edwardsi*, and the punctation of the abdomen is not obsolescent on the disk as in that species.

Specimens of this species have to my knowledge never been collected at the same place and time as *T. edwardsi*. If the Koebele Oregon records of *edwardsi* are doubted, then the ranges of the two species meet in the Santa Cruz Mountains.

A specimen from Oregon in the Riley collection in the U. S. National Museum was labeled *T. edwardsi* var. Examples in my collection were identified by T. L. Casey for F. W. Nunenmacher as *T. crotchii*. An example in the Fenyes collection in the California Academy of Sciences was labeled *T. crotchii*. Other examples have been labeled *T. edwardsi* in various collections.

Several Vancouver specimens were taken "under bark," but I find no other record of the habits of the species.

Trigonurus crotchii Leconte

Trigonurus crotchii LECONTE, 1874, p. 48.—SHARP, 1875, p. 205.—FAUVEL, 1878, pp. 185, 187.—BERNHAEUER AND SCHUBERT, 1910, p. 5.—KEEN, 1905, p. 297.—LENG, 1920, p. 92.—VAN DYKE, 1934, pp. 177, 178, 180, 181, 182.—BLACKWELDER, 1939, p. 22.

Trigonurus leconteus SHARP, 1875, pp. 205, 206.—BLACKWELDER, 1939, p. 22.

Trigonurus lecontei SHARP, 1875, p. 206.—BERNHAEUER AND SCHUBERT, 1910, p. 5.—LENG, 1920, p. 92.—BLACKWELDER, 1939, p. 22.

Trigonurus leconteus SHARP, FAUVEL, 1878, pp. 185, 187.—VAN DYKE, 1934, pp. 177, 178.

DESCRIPTION.—Piceorufous to testaceous. Head without distinct longitudinal depressions but feebly elevated at middle of vertex; frontal suture distinct and somewhat impressed; punctures sparse and fine. Pronotum three-fourths to two-thirds as long as wide, widest at basal third, thence very slightly narrowed to base and anterior third, from anterior third more narrowed but not arcuately; the anterior angles rounded, the basal angles nearly right; feebly convex and more or less flattened on the disk; midline shallowly but abruptly impressed, and with a less distinct short transverse impression just before base, and a broad shallow concavity at each posterior angle; punctures moderately coarse, generally separated by about half their diameters by fairly flat intervals; with indistinct strigulose ground sculpture. Hypomera impunctate except on the lobes. Prosternum with coarse punctures obliterated to form coarse rugose sculpture. Elytra con-

jointly three-fourths as wide as long, one-tenth wider than pronotum; widest along middle and feebly narrowed to base and apex; humeral angles prominent, apex feebly arcuate with lateral angles rather narrowly rounded; with distinct impressed striae strongly punctate but with the punctures somewhat indefinite; the first seven striae complete and regular, the eighth obsolescent, less coarsely punctate and visible only posteriorly; intervals shining but minutely uneven. Abdomen moderately punctate above, a little more densely at the sides; with vague traces of ground sculpture. Length, $3\frac{1}{2}$ to $4\frac{3}{4}$ mm.

TYPE LOCALITY.—“Vancouver,” British Columbia. Of *lecontus*, California.

TYPES.—Holotype, No. 6617, Leconte collection in the M.C.Z.; one paratype in the Sharp collection in the British Museum. Of *lecontus*, holotype in the British Museum.

RECORDS.—The following are the records known to me:

CALIFORNIA: (Amer. Mus. Nat. Hist.; Leconte coll. in Mus. Comp. Zool.), Sylvania (Bowditch coll. in Mus. Comp. Zool.); HUMBOLDT COUNTY (Blackwelder coll.), Fieldbrook (U. S. Nat. Mus.); MONTEREY COUNTY, Monterey (Fenyès, in U. S. Nat. Mus.; Liebeck coll. in Mus. Comp. Zool.), Pacific Grove (Fenyès and Blaisdell, in Cal. Acad. Sci.; Mann, in Blackwelder coll.), Carmel (Van Dyke, 1934); SANTA CRUZ COUNTY, Santa Cruz Mountains (U. S. Nat. Mus.); SANTA CLARA COUNTY, Los Gatos (U. S. Nat. Mus.); SAN BERNARDINO COUNTY (U. S. Nat. Mus.), Hesperia (U. S. Nat. Mus.); SONOMA COUNTY (Fall coll. in Mus. Comp. Zool.), Cazadero (Van Duzee, in Cal. Acad. Sci.); Duncan Mills (Blaisdell, in Cal. Acad. Sci.); SHASTA COUNTY, Castle Crag (Fenyès, in Cal. Acad. Sci.); LAKE COUNTY, Bartlett Springs (Fenyès, in Cal. Acad. Sci.); SISKIYOU COUNTY, Duns-muir (Fenyès, in Cal. Acad. Sci.).

OREGON: (Riley, in U. S. Nat. Mus.); JOSEPHINE COUNTY (Nunen-macher, in Blackwelder coll.); LINN COUNTY, Santiam (Fall coll. in Mus. Comp. Zool.).

WASHINGTON: GRAYS HARBOR COUNTY, Hoquiam (Burke, in U. S. Nat. Mus.); THURSTON COUNTY, Tenino (Hubbard and Schwarz, in U. S. Nat. Mus.);

PIERCE COUNTY, Tacoma (Fall coll. and Blanchard coll. in Mus. Comp. Zool.).

BRITISH COLUMBIA: NEW WESTMINSTER DISTRICT, Vancouver (Leconte, 1874; Fauvel, 1878; Leech, in Cal. Acad. Sci.).

ERRONEOUS OR DOUBTFUL RECORDS.—The following records have not been verified and are doubted for the reasons given in each case:

California: Sierras of California (Leconte, 1874; Fauvel, 1878). (*T. crotchii* was described from specimens from “Vancouver Island and Sierra of California.” The Leconte collection now contains a single example, labeled “Vanc.” The Sharp collection in the British Museum contains two examples received from Dr. Leconte, labeled merely California. That these came from the Sierra Nevada Mountains is doubtful because of the complete lack of later records from east of Shasta County.) Marin County, Inverness (Van Dyke, 1934). (This record is somewhat doubtful because of the commonness of *T. sharpi* at this locality. The segregation of this species necessitates a reexamination of these specimens.) Eldorado County, Soda Springs (Blaisdell, in Calif. Acad. Sci.). (I can find no such locality as Soda Springs in Eldorado County. There is such a town near Truckee in Nevada County, but this species seems to be restricted to the Coast Ranges. There is a possibility that this is an error for Soda Spring, Mendocino County, which is well within the known range of the species.)

British Columbia: Queen Charlotte Islands (Van Dyke, 1934). (Dr. Van Dyke assumes the synonymy of *T. nebrionides* Fauvel, MS. of Keen, 1895, with *T. crotchii*. It will be necessary to examine the specimens to determine which species is involved.) Coast District (Keen, 1905). (This determination was probably made by Prof. H. F. Wickham. Since the latter had in his collection only one of the three species involved, it is unwise to assume that the determination is correct.)

Alaska: (Van Dyke, 1934). (This record is apparently based upon *T. subcostatus* Mäkl. which Dr. Van Dyke be-

lieves to be a synonym of *T. crotchii*. That it is distinct I have tried to prove above.)

SPECIMENS EXAMINED.—I have studied the types in both the Leconte and Sharp collections and have seen in addition 37 examples in the U. S. National Museum, six in The American Museum of Natural History, 39 in the California Academy of Sciences, one in the British Museum, five in the Leconte collection in the Museum of Comparative Zoölogy, four in the Bowditch collection, three in the Blanchard collection, and 18 in my own collection.

REMARKS.—This species may be distinguished from all other American species by its obsolescent eighth elytral series; it is also the only one in which the elytral striae are distinctly impressed.

Some of the localities listed above as doubtful may be found to be valid, but the extension of the range into Alaska is at least at present doubtful. This appears to be the commonest coastal species, but the largest number of specimens taken at any one time appears to be 13, collected by F. W. Nunenmacher in Josephine County, Oregon. A series of 23 was collected by Dr. F. E. Blaisdell at Duncan Mills, California on June 26, 28, 30, and July 16, in 1908.

T. lecontus Sharp was recognized as a synonym of *T. crotchii* by Van Dyke in 1934 and by Blackwelder in 1939, in each case after an examination of the types of both species. Dr. H. C. Fall had come to the same conclusion after an examination of the Leconte collection, and recorded the fact in his notebook (now in the Museum of Comparative Zoölogy).

No matter what the disposition of *lecontus* there is no justification for the change of the spelling to *leconteus* or *lecontei*. Dr. Sharp specifically states, "I have used the trivial word *Lecontus*, in preference to *Lecontei*, a word of which the pronunciation at least is ambiguous." Although our International Rules (Article 14) state that "If the (specific) name is a modern patronymic, the genitive is always formed by adding to the exact and complete name, an *i* if the person is a man. . .," they do NOT say that names based upon the names of persons MUST be placed in the genitive.

And they do say (Article 19) that "The original orthography of a name is to be preserved unless an error of transcription, a *lapsus calami*, or a typographical error is evident."

Two Vancouver specimens were found under bark of *Abies* sp. Dr. Van Dyke's records from two species of *Pinus* depend on the identification of the specimens.

***Trigonurus caelatus* Leconte**

Trigonurus caelatus LECONTE, 1874, p. 48.—SHARP, 1875, p. 205.—FAUVEL, 1878, pp. 185, 186, 187.—BERNHAEUER AND SCHUBERT, 1910 p. 5.—LENG, 1920, p. 92.—VAN DYKE, 1934, pp. 177, 178, 179, 181, 182.—BLACKWELDER, 1939, p. 22.

DESCRIPTION.—Piceorufous to rufotestaceous. Head almost entirely without longitudinal impressions, with frontal suture somewhat impressed; rather densely punctate behind the frontal suture, very sparsely before. Pronotum five-sixths as long as wide, widest just behind middle; sides not at all angulate, nearly straight in basal third and gradually rounded to front angles which are rather broadly rounded; basal angles nearly right; disk fairly evenly convex, except for a shallow and indefinite median longitudinal depression, a feeble semicircular depression in front of scutellum, and a broad but feeble concavity at each posterior angle; punctures rather coarse with intervals varying in width but not rugose, with much smaller punctures interspersed but without strigulose ground sculpture. Hypomera coarsely punctate throughout. Prosternum with coarse punctures throughout but shallower medially. Elytra conjointly nearly five-sixths as wide as long, one-sixth wider than pronotum, widest at basal two-fifths and moderately evenly narrowed to base and apex; humeral angles somewhat prominent, apex diagonally truncate with outer angles narrowly rounded; not striate but with nine longitudinal series of coarse punctures, the first seven usually fairly regular and complete but sometimes irregular posteriorly or somewhat rugose in front, the eighth fairly regular and extending little past the middle from the apex; the intervals shining. Abdomen not very finely punctate, about as densely at center as at sides; with very fine strigulose ground sculpture. Length, 4 to 5 mm.

TYPE LOCALITY.—Sierras of California.

TYPES.—Lectotype, No. 6616, Leconte collection in the Museum of Comparative Zoölogy; one paratype in the same collection and one in the Sharp collection in the British Museum.

RECORDS.—The following are the records known to me:

CALIFORNIA: (Leconte coll. in Mus. Comp. Zool.), Sierras of California (Leconte, 1874; Fauvel, 1878), Riverton (Hinton, in Blackwelder coll. and Cal. Acad. Sci.); ELDORADO COUNTY (Nunemacher, in Blackwelder coll.), Pacific (Hinton, in Blackwelder coll. and Cal. Acad. Sci.); TUOLUMNE COUNTY, Mill (Hinton, in Blackwelder coll. and Cal. Acad. Sci.); ALPINE COUNTY (Blaisdell, in Cal. Acad. Sci.); TULARE COUNTY (Blaisdell, in Cal. Acad. Sci.); FRESNO COUNTY, Huntington Lake (Blaisdell, in Cal. Acad. Sci.); CALAVERAS COUNTY, Big Trees (Blaisdell, in Cal. Acad. Sci.), Douglas Station (Hinton, in Blackwelder coll.); SAN JOAQUIN COUNTY, Calaveras (U. S. Nat. Mus.; Fall coll. in Mus. Comp. Zool.); MARIPOSA COUNTY, Miami (Fenyès, in Cal. Acad. Sci.).

ERRONEOUS OR DOUBTFUL RECORDS.—The following records have not been verified and are doubted for the reasons given in each case:

California: Sierra Nevada Mountains . . . everywhere . . . from Shasta County to Tulare County (Van Dyke, 1934). (I believe it likely that part of these records are based on misidentifications of *rugosus*).

SPECIMENS EXAMINED.—I have studied the two types in the Leconte collection and the paratype in the British Museum, and also two examples in the U. S. National Museum, 28 in the California Academy of Sciences, 2 in The American Museum of Natural History, 10 in various collections in the Museum of Comparative Zoölogy, and 17 in my own collection.

REMARKS.—This species can be readily distinguished from the other American species except *rugosus* by the characters given in the key. From *rugosus* it is sometimes separated with difficulty as is explained below.

Dr. Van Dyke records *caelatus* from the Sierras "from Shasta County to Tulare County" and *rugosus* from "the mountains in the neighborhood of Mt. Shasta." Of *rugosus* he writes that it "may prove to be but a subspecies of *caelatus*. So far it stands apart and should be considered as distinct until we can find specimens from presumed intermediate territory which

bridge the gap between the two." Under my interpretation of these species, *rugosus* ranges from Siskiyou and Shasta counties to Lake Tahoe but has been found only at considerable altitudes (over 5000 feet) at least in the southern part of its range. On the other hand *caelatus* occurs from Tulare County to Alpine and Eldorado Counties in the foothills and western slope of the Sierras with few records of its occurrence in the higher parts of the mountains except in the south.

However, these two species are not definitely distinguishable by any single character. Specimens of *caelatus* even from the southern parts of the range occasionally show one or two of the characters used here to distinguish *rugosus*. On the other hand no example from the northern Sierras (presumably *rugosus*) has been seen to have any of the characters assigned to *caelatus*. It is therefore still necessary to conclude that these two species are closely related, that they may represent merely two subspecies, and that many more records and hours of study are required to furnish a definite solution. At present the known ranges do not actually overlap and specimens are identifiable without reference to the locality.

This species was recorded by Leconte from under bark of pine and by Dr. Van Dyke from under bark of yellow pine.

Trigonurus rugosus Sharp

Trigonurus rugosus SHARP, 1875, pp. 204, 205.—FAUVEL, 1878, p. 185.—BERNHAEUER AND SCHUBERT, 1910, p. 5.—LENG, 1920, p. 92.—VAN DYKE, 1934, pp. 177, 178, 179, 182.—BLACKWELDER, 1939, p. 22.

DESCRIPTION.—Piceorufous to rufotestaceous. Head unimpressed except feebly along frontal suture; densely and not very finely punctate, much sparser before the frontal suture. Pronotum five-sixths as long as wide, widest at basal third, feebly narrowed to base, nearly parallel to anterior third, thence moderately narrowed to prominently rounded anterior angles, basal angles nearly right; disk evenly convex except for an indefinite and feeble impression along the midline, another of indefinite shape transversely near base, and a broad concavity at each posterior angle; punctures coarse and dense, the intervals more or less rugose, very seldom smooth or with distinct smaller punctures, punctures not coarser in the depressions; without strigulose ground sculpture. Hypomera

coarsely punctate throughout. Prosternum coarsely punctate throughout. Elytra conjointly seven-ninths as wide as long, nearly one-eighth wider than pronotum, widest along middle and feebly narrowed to base and apex; humeral angles moderately prominent, apex feebly arcuate but outer angles broadly rounded; not striate but with nine longitudinal series of coarse punctures, the intervals irregularly diagonally rugose near scutellum, the punctures somewhat irregular apically especially near the suture, the eighth with punctures fairly coarse but irregular and frequently doubled, usually extending nearly to humerus; intervals shining. Abdomen with moderately coarse but shallow punctures not denser medially but a little less coarse; with fine strigulose ground sculpture. Length, 4 1/2 to 5 mm.

TYPE LOCALITY.—California.

TYPES.—Type and 15 other examples (one labeled paratype) in the British Museum. One "Independent type" from the Sharp collection is now in the Leconte collection in the Museum of Comparative Zoölogy.

RECORDS.—The following are the records known to me:

CALIFORNIA: (Bowditch coll. in Mus. Comp. Zoöl.; Sharp, 1875; Fauvel, 1878); PLACER COUNTY (Koebele, in U. S. Nat. Mus.), Lake Tahoe (Fuchs, in Amer. Mus. Nat. Hist.; U. S. Nat. Mus.; Blackwelder coll.; Fall coll. in Mus. Comp. Zoöl.); ELDORADO COUNTY, Tallac (Fenyès, in Cal. Acad. Sci.; Fall coll. in Mus. Comp. Zoöl.); NEVADA COUNTY, Truckee (Wickham, in Cal. Acad. Sci.); SISKIYOU COUNTY, McCloud (Fenyès, in Cal. Acad. Sci.), Sisson (Wickham, in U. S. Nat. Mus.); PLUMAS COUNTY, Mohawk (Fenyès, in U. S. Nat. Mus.; Fall coll. in Mus. Comp. Zoöl.); SHASTA COUNTY, Mt. Shasta region (Van Dyke, 1934).

NEVADA: Lake Tahoe (U. S. Nat. Mus.).

SPECIMENS EXAMINED.—I have studied the types in both the British Museum and the Museum of Comparative Zoölogy. In addition I have examined 26 specimens in the U. S. National Museum, six in the California Academy of Sciences, three in The American Museum of Natural History, 14 in the British Museum, two in my own collection, and one in the Leconte collection, four in the Fall collection, one in

the Bowditch collection (all in the Museum of Comparative Zoölogy).

REMARKS.—This is a very distinct species in appearance but is difficult to separate from *caelatus* because of the variability of the latter species. Notes on these two will be found under *caelatus*.

I do not question Dr. Van Dyke's record of *rugosus* from the "neighborhood of Mt. Shasta" since there is little question of the identification and his description and figure leave no doubt of it. I believe, however, that Dr. Van Dyke has erred in the identification of *caelatus* from north of Lake Tahoe and that these records should be listed as *rugosus* which certainly does occur as far south as Lake Tahoe. Re-examination of the specimens will doubtless settle this matter readily.

The possibility of *rugosus* being merely a subspecies of *caelatus* is unaffected by these records, since the ranges still meet, merely at a more southern point than thought by Dr. Van Dyke. This cannot be settled by random collections no matter how well these cover the intermediate territory, since it is absolutely necessary to know the variation of each species. This can only be determined from a long series collected at one time and place, and preferably from several such series. The largest series that I have seen contain only 7 and 8 specimens of *rugosus* and only 10 and 13 specimens of *caelatus*. These indicate that *caelatus* is more variable, but they are insufficient to be at all conclusive.

There is no question that these two species differ from each other less than from other members of the genus. But there is no necessity for all our species being of equal isolation or at corresponding stages of evolution. Subspecies may at times be embryonic species, but, until the subspecific status can be reasonably well demonstrated, it is much easier for us to record the known data under two species.

I find no record of the habits of this species.

Trigonurus dilaticollis Van Dyke

Trigonurus dilaticollis VAN DYKE, 1934, pp. 178, 179, 182.—HOPPING, 1936, p. 65.—BLACKWELDER, 1939, p. 22.

DESCRIPTION.—Piceous to piceofufous. Head

without longitudinal impressions but with frontal suture finely impressed, with a broad fovea at each end of the frontal suture; rather finely punctate, but less distinctly before the frontal suture. Pronotum three-fifths as long as wide, widest near middle, the sides broadly rounded, arcuately narrowed in front, the sides becoming nearly straight basally but the base much narrower than middle; the front angles obtuse and not prominent, the basal angles nearly right; feebly convex with disk flattened throughout the length, the midline vaguely depressed, and with a very large and deep fovea at each posterior angle; the punctures fairly coarse, slightly elongate and occasionally united in longitudinal groups; the intervals generally less than half as wide as the punctures but flat, with indistinct strigulose ground sculpture. Hypomera densely and coarsely punctate throughout. Prosternum with very coarse punctures becoming transversely elongate near middle. Elytra conjointly three-fourths as wide as long, one-fifth wider than pronotum, widest along middle and feebly narrowed toward base and apex, but with basal and apical angles broadly rounded making the elytra appear to be narrowed at base, apex truncate but conjointly triangularly emarginate at middle; very feebly striate but with the striae marked by series of very coarse punctures, generally regularly placed but somewhat obscured by very irregular punctulae on the moderately convex intervals, the outer more obscured though more impressed and the seventh scarcely traceable. Abdomen with moderately coarse shallow punctures about as dense at middle as sides; with feeble strigulose ground sculpture. Length, 6 mm.

TYPE LOCALITY.—California, Lagunitas Canyon, Marin County.

TYPES.—Holotype, No. 3850, California Academy of Sciences, collected by Dr. E. C. Van Dyke on April 9, 1911.

RECORDS.—The following are the records known to me:

CALIFORNIA: MARIN COUNTY, Lagunitas Canyon (Van Dyke, 1934), Sylvania (U. S. Nat. Mus.).

BRITISH COLUMBIA: Pender Harbor (Hopping, 1936); Steelhead (Hopping, 1936; H. B. Leech, in Leech coll., Fall coll. in Mus. Comp. Zool., and Blackwelder coll.); Vancouver (U. S. Nat. Mus.).

SPECIMENS EXAMINED.—I have examined Dr. Van Dyke's type briefly and have studied two examples in the U. S. National Museum, one in Mr. Leech's collection, one in the Fall collection in the Museum of Comparative Zoölogy, and one in my own collection.

REMARKS.—This species is very distinct from all the other American species by the shape of the pronotum and elytra. The name implies that the pronotum is dilated but in reality it is merely cut away at the base. This illusion is increased by the unusually rapid narrowing of the base of the elytra. The species is also very distinct by the presence of the irregular punctulae on the narrow intervals of the coarse elytral punctures. This is the cause of the general dull appearance.

Two specimens of this species in the Hubbard and Schwarz collection in the United States National Museum were separated out as a new species by Dr. E. A. Chapin before Dr. Van Dyke's description appeared. The MS. name placed on these specimens is not included in the synonymy of this species since it has not gotten into either the literature or other collections.

The species was originally found under bark of *Sequoia sempervirens* but must live in other trees at least in the northern localities.

Trigonurus Mellyi Mulsant

Trigonurus mellyi MULSANT, 1847, p. 516, Pl. VII, fig. 2.—GAUBIL, 1849, p. 258.—LACORDAIRE, 1854, p. 123.—DUVAL, 1857, p. 61, Pl. XXIII, fig. 113.—REDTENBACHER, 1858, p. 239.—REICHE, 1865, p. 642.—SOLSKY, 1868, p. 161.—FAUVEL, 1872, p. 17.—LECONTE, 1874, p. 48.—SHARP, 1874, p. 421.—REDTENBACHER, 1874, p. 263.—SHARP, 1875, p. 204.—MULSANT AND REY, 1878, p. 214.—GANGLBAUER, 1895, p. 684.—HEYDEN, REITTER, AND WEISE, 1906, p. 126.—BERNHAEUER AND SCHUBERT, 1910, p. 5.—WINKLER, 1925, p. 323.—PORTA, 1926, p. 6.—PORTEVIN, 1929, p. 429.—SCHEERPELTZ, 1933, p. 993.—VAN DYKE, 1934, p. 177.

Trigonurus mellyi SCHAUM, 1849, p. 148.

DESCRIPTION.—(From various writers.) Shining black with head, last segment of abdomen and half of penultimate pale, labrum, mandibles, palpi, and antennae fulvous or rufescent. Head superficially punctulate; marked by a light frontal suture of a straight line, separating the flat triangular epistoma from the front; excavated behind the eyes with a transverse groove. Pronotum subdepressed; about a sixth less long than the widest of the posterior parts, a little narrower than the elytra at base; bisubsinuately truncate in front; subcurvilinear and rather feebly enlarged from the front posteriorly as far as the middle, parallel thence to base; the base truncate in a nearly straight line; posterior angles very pronounced, somewhat directed posteriorly and reposing in a small fossa of

the humeral angles of the elytra; narrowly bordered at the edges; longitudinally excavated with a broad channel at middle, gradually shrunk toward the apex and base, so that it does not or scarcely attains them; on each side of the sulcus with a broad longitudinal fossa, bordering on the external fourth of the base and anteriorly prolonged nearly to the middle of the length; densely punctate. Scutellum large, subparallel in the basal two-fifths, subcircular or broadly ovoid (arched) in the posterior three-fifths; punctate on the disk. Elytra a little more broad at the humeral angles than the pronotum at the posterior angles; subcurvilinearly enlarged from the base to a fifth of the length, subparallel thence to the extremity; truncate posteriorly; elevated laterally at the edge rather narrowly; rim almost smooth, punctulate longitudinally along the edge, narrowed from front to rear and more distinct in the last fifth, terminated in a point; depressed or subdepressed above; each channelled by nine punctate striae, the punctures transversely oval, more feeble toward apex and upon the three external striae; intervals in part subcrenulated by the striae punctures; the first and ninth intervals enlarged from front to rear, the first seven, from the suture, elevated in feeble carinae gradually feebler to the base from the apex, the seventh abutting the humeral angle, the third external flat or nearly so; excavated in a longitudinal fossa on the posterior fifth of the eighth stria. Prosternum strongly punctate on the posterior half, longitudinally strigulose in front; front coxae less enclosed behind but more covered at the sides than in *T. rugosus*. Mesosternum feebly carinate, very coarsely punctate. Metasternum convex, subdepressed and less strongly punctate at middle of disk; strongly punctate. Abdomen with retractile segment armed with very short and indistinct bristles and two rather distinct bristles; four last segments of the abdomen forming a triangle directed to the rear; venter convex, more obsoletely punctate or almost smooth on the median area, with first four segments finely bordered apically and subimpressed on the edges; the fifth concave at apex, the sixth subtruncate; prebasal piece finely chagreened, sparsely and obsoletely punctate, a little rufescent anteriorly. Legs moderate; trochantin of front coxa very distinctly visible; tibia finely and shortly pubescent, in part; tarsus pilose, more densely beneath, the posterior longer, ♂ anterior tarsus distinctly dilated. Length, 5 to 6 mm. Width, 2.1 mm.

TYPE LOCALITY.—"A la grande Chartreuse," France.

TYPES.—In either the Institut Ste. Marie at Chamond or the Musée d'Histoire Naturelle in Lyon.

RECORDS.—The following are the records known to me:

FRANCE: Various localities in the

Maritime Alps, the Grande-Chartreuse Mountains near Lyon (Lacordaire, 1854; and later writers).

ITALY: Maritime Alps (Porta, 1926).

REMARKS.—Notes on this species will be found under "Remarks" on the genus. I have examined briefly one example in the British Museum and have incorporated my observations in the above description.

Trigonurus asiaticus Reiche

Trigonurus mellyi MULSANT, AUBÉ, 1850, Bull. p. xxii.—REICHE, 1865, p. 642. (Misidentification.)

Piestus asiaticus MONTANDON MS.—REICHE, 1865, p. 642.

Trigonurus asiaticus REICHE, 1865, p. 642.—SOLSKY, 1868, pp. 161, 163, Pl. IV, figs. 3, 3a-e.—FAUVEL, 1872, pp. 17, 18.—FAUVEL, 1878, p. 186.—MULSANT AND REY, 1878, p. 216.—HEYDEN, REITTER, AND WEISE, 1906, p. 126.—BERNHAEUER AND SCHUBERT, 1910, p. 5.—WINKLER, 1925, p. 323.—VAN DYKE, 1934, p. 177.

DESCRIPTION.—(From various writers.) Form as in *T. mellyi*, elliptical, depressed; piceous black, glabrous, pronotum and elytra opaque, rest shining; head nigropiceous but rufopiceous in front; mouth, antennae, legs, and margins and apex of abdomen rufopiceous. Head small, much narrower than pronotum, convex; transversely sulcate behind the eyes; the frontal suture distinct; clypeus deeply longitudinally impressed at sides, feebly at center; finely sparsely punctate, the front between the eyes rather profoundly bi-impressed, subgibbous at middle; eyes moderately prominent; antennae longer than head and pronotum, scarcely incrassate apically, segments subcylindrical, third almost one-half longer than second, the rest subequal, the last oblong-ovate, acuminate. Pronotum broad, transverse, scarcely narrower than elytra, sides feebly rounded, subsinuate before the base, in front a little more narrowed than toward the base, posterior angles right, anterior rotund, base truncate, scarcely subtrisinuate, apex a little sinuate; dorsum deplanate, densely but less deeply punctate, finely rugulose; the middle with a feeble longitudinal impression evanescent slightly before base and apex; at sides with deep longitudinal impressions abbreviated a little behind the middle. Scutellum large, triangular, strongly punctate, opaque. Elytra almost twice as long as pronotum, base truncate, sides feebly rotund, apex a little more narrowed than base, sides and humerus narrowly reflexo-marginate, apex singly rotundato-truncate; dorsum deplanate in front, a little convex; feebly longitudinally impressed behind scutellum near suture on both sides; rugulose, opaque; punctatostriate, striae and punctures a little irregular, the latter somewhat deep; the intervals feebly convex, the third a little more elevated,

the seventh carinate from the humeral callus beyond the middle. Prosternum rugulose, subopaque, somewhat deeply variably less densely punctate, medially smooth before the anterior coxae, punctures less dense than at sides, transversely plicate. Mesosternum medially longitudinally carinate. Metasternum large, densely punctate, feebly transversely undulate. Abdomen almost as wide as elytra, gradually attenuate toward apex; first dorsal segments finely sparsely punctulate, last segment smooth; first ventral at sides strongly rather densely, at middle finely sparsely punctate, second sparsely at sides, at middle almost smooth, rest almost impunctate. Length, 5 to 6 mm.; width, 2 to 2 1/4 mm.

TYPE LOCALITY.—“De Batoum, Immeretie.”

TYPES.—Probably in the Musée National d'Histoire Naturelle, Paris.

RECORDS.—The following are the records known to me:

CAUCASUS: (Aubé, 1850, as *mellyi*; Lacordaire, 1854, as *mellyi*; Solsky, 1868; Fauvel, 1872; Bernhauer and Schubert, 1910; Van Dyke, 1934); Batum (Reiche, 1865).

REMARKS.—Notes on this species will be found under “Remarks” on the genus. I have seen no examples and do not know definitely where any are to be found.

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